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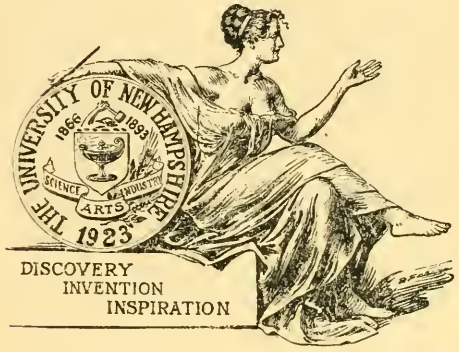

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NEW HAMPSHIRE
AGRICULTURAL EXPERIMENT STATION

DEPARTMENT OF ANIMAL HUSBANDRY

COST OF RAISING BEEF CATTLE IN NEW HAMPSHIRE

By E. G. RITZMAN

NEW HAMPSHIRE COLLEGE
OF
AGRICULTURE AND THE MECHANIC ARTS
DURHAM, N. H.

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COST OF RAISING BEEF CATTLE IN NEW HAMPSHIRE.

By E. G. Ritzman.

The fall of 1917 found New Hampshire farmers with their barns pretty well filled with hay. This included not only the 1917 crop but also in many instances a considerable amount left over from the preceding year. Hay values were comparatively low at that time, grades of stock hay in the barn ranging all the way from $6 to $16, depending on the quality and distance or accessibility to railroads or markets. Hay was not easy to dispose of so as to leave a fair margin of profit and many farmers began to figure how they could put it to good use in other ways.

The advisability of turning this hay into beef again came into the foreground somewhat as a possible solution to the problem. This question has long been the subject of much controversy but of little experimentation so that accurate and definite results applicable to some of our varied New England conditions have been notably lacking.

The results of an experiment by the New Hampshire Experiment Station in wintering a small bunch of beef calves with the primary object of utilizing an inferior grade of stock hay during the winter of 1917 to 1918 is here given.

These animals included ten head of Hereford steer calves brought to New Hampshire from Texas. They were a part of several car-loads distributed among farmers to be used with a similar object in view. They were all dropped the spring preceding and ranged between seven and nine months of age. The average weight per head of these ten calves at the beginning of the experiment, December 1, 1917, was 343 pounds. Of course it was obvious that animals of such immature age would not make a normal growth on a ration consisting solely of roughage such as is furnished by average grades of stock hay for lack of sufficient nitrogen contained in the amount of dry matter that they could handle. It was assumed, therefore, that the most economic ration would include all the native hay they would eat

with enough of a high protein concentrate to balance the nitrogen requirements for growth.

Character and Quality of Hay Used.

New Hampshire hay, known generally as native hay but commercially as "Stock Hay," varies considerably in the character of the grasses from which it is made as you go from low lands to higher altitudes. So far as its feeding value is concerned an even greater variation in quality results from the prolonged period during which first cut hay is made. This often extends from late June into September.

The hay used here was cut in September so that a low digestibility, due to a highly fibrous character, was further accentuated by late cutting. The market value was but little over half the value of No. 1 Stock Hay with practically no demand for hay of that quality at that time.

No factor for the digestibility of this type of hay was available but it was safe to assume that it would be relatively low. A grade of native hay of a much superior quality shows the following analysis: Dry matter, 90.68; crude protein, 6.41; fat, 2.07; carbohydrates, 78.11.

Nutritive Requirements and Supply.

The average weight of these animals at beginning of the experiment was 343 pounds. Allowing for a considerable shrinkage, which they must have suffered in shipment from Texas and from some driving at this end, it was assumed that the ration should be calculated on a 500-pound basis as the final probable average for the whole winter period. Growing animals of this age and weight require per 1,000 pounds live weight, 25 pounds dry matter, 2.5 pounds digestible protein, 13.2 pounds digestible carbohydrates and 0.7 pounds digestible fat. To keep them in thrifty growing condition would actually require about one-half that amount per head as a daily average based on the accepted feeding standards.

To balance the native hay which is low in digestible protein cottonseed meal was chosen as the cheapest high protein concentrate. To render the meal more palatable and at the same

time to offset its astringent character the meal was mixed with wheat bran in the proportion by weight of one part bran to two of meal.

From a survey of the field in which the hay was cut the relative proportion of grasses in the hay was estimated at 50 per cent Witch Grass, 10 per cent Red Top, 10 per cent June Grass, 25 per cent Timothy and 5 per cent of other mixed varieties.

On the basis of Henry's tables on digestibility the ration as fed had approximately the following composition in digestible nutrients:

	Dry Matter, Lbs.	*Protein,* Lbs.	*Carbohydrates,* Lbs.	*Fat,* Lbs.
12½ Lbs. native hay	11.35	.62	5.38	.13
3 Lbs. meal mixture	2.70	.76	.928	.19
Total ration	14.00	1.38	6.31	.32
Total required	12.50	1.25	6.60	.35

While there was apparently a surplus of dry matter this was easily offset by some wastage of hay due to its poor quality, which waste was used for bedding. The amount actually used was somewhat less as will be seen in the following table or balance sheet on the financial operation between December 1, 1917, and May 15, 1918.

Winter Period—December 1 to May 15.

Average weight, December 1, 1917	343.0 lbs.		
Average weight, May 15, 1918	504.0 lbs.		
Total gain per head	161.0 lbs.		
Daily gain per head	1.0 lbs.		
Total hay consumed	17,847.0 lbs.		
Total cottonseed meal consumed	3,042.0 lbs.		
Total bran consumed	1,500.0 lbs.		
Total middlings consumed	484.0 lbs.		
Cost of steers, December 1, 1917			$425.00
Value on May 15, 1918 (on market basis at 14c)		$705.60	
Interest on investment at 6 per cent			19.00
Cost of hay at $9 per ton			80.31
cottonseed meal at $52 per ton			80.10
bran at $2.45 per cwt			36.75
middlings			13.52
salt			1.50

Labor charge, chores, 86 hours at 35c		$30.10
Value of manure:		
12 cords heavy manure at $4	$48.00	
5 cords medium manure at $2.50	12.50	
9 cords light strawy manure at $1	9.00	
	$775.10	$685.28
Net profit	$89.82	

Pasture Period—May 15 to October 26.

Shortly after being turned out to pasture three steers got on the railroad track and were killed. Pasture, therefore, includes results on seven head only.

Average weight, May 15	547.00 lbs.	
Average weight, October 26	750.00 lbs.	
Total gain per head	203.00 lbs.	
Daily gain per head	1.20 lbs.	
Interest on investment		$17.40
Pasture charge (5½ months at $1.50 per month)		57.75
Salt		2.00
Labor		5.00
Value of steers, May 15 at 14c		536.05
Value of steers, October 26 at 15c	$787.50	
	$787.50	$618.20
Balance net profit	$169.30	
Net profit per head	27.04	

The values per pound live weight for May 15, 1918, and October 26, 1918, are estimates based on prices current in the open markets at that time. The only criticism of these estimates that could be offered is that in an effort not to show the results in too optimistic a light the October (1918) price given is perhaps somewhat lower than that which could have been obtained on the Brighton market or any other market where bidding has some competition.

Factors That Made a Net Profit on Winter Feeding.

Barring accidents, such as the loss of stock from disease for which there may be no compensation, there are four factors which may vary so as to be the cause of either profit or loss. These are (1) the character of the animal, its ability to make

good use of the feed and its tendency to develop good beef form; (2) amount of labor; (3) variation in price of feed, and (4) variation in price of beef.

The first two of these factors (labor and selection of the stock) are purely a matter of management whose control lies entirely in the hands of the individual farmer. The third (the cost of feed) lies under his control in proportion to the amount of the feed he is able to grow and the cost at which he can grow it; otherwise if he buys it all it is entirely beyond his control. The fourth (price of beef) lies entirely outside the influence of the individual farmer.

In this experiment all four of these factors contributed to the net profit which accrued after paying all bills and allowing a good price on the hay. The animals made good gains; labor was reduced to a minimum; feed, especially hay, was not quoted high on the market; and the price of beef went up.

It is interesting to study the effect on net profits caused by the use of poor stock, an excessive amount of labor, high price of feed, or a decline in price of beef.

In growing beef, the quality of the animal is probably the most important single factor not only because gain means profit but also because scrubs are worth less per pound. In this instance a half a pound of daily gain instead of a pound would have eliminated the net profit entirely.

The labor in this instance was reduced to a minimum. Had the conditions been such as to treble the time necessary for daily care, a condition which could easily occur by careless management, the net profit would also have been absorbed. A decline of one cent below the purchase price of live stock would have had a similar effect, and the same would have occurred if the hay had cost $18 instead of $9 per ton. The grain was bought at a price which is seldom much higher in proportion to beef cattle prices. In fact, a close study of the market shows that the price between grain and beef is much more closely related than between hay and beef so that a poor choice of feed is more often the cause of loss than is an unequal fluctuation in the price of grain, where one buys grain for growing cattle merely to balance the ration. This is quite a different problem than that of buying grain to fatten cattle on a heavy ration.

Grain for Beef Production in New Hampshire.

As the West produces most of the beef and most of the grain it is on a basis of western production of both that the price of beef and grain is established. The New England farmer who buys grain is, therefore, at a special handicap with the western farmer who grows it because he has to add transportation charges plus several middlemen's profits who handle it to his price of grain. When one considers the additional fact that grain will give less returns in pounds of finished or fat beef than in pork, lamb, milk, or eggs, it is obvious that there must be special economies along other lines that make the use of grain profitable for beef production here. When one further considers that perishable products like milk must be produced relatively near the center of consumption or, in other words, that New England farmers have no western competition in producing milk for the market it becomes clear why dairying is and will be the backbone of the live stock industry in New England. Excepting pure bred, registered beef cattle stock whose offspring has exceptional value, a dairy cow, a laying hen, or a work horse are about the only mature animals for which a New England farmer can afford to buy grain. If they are not high producers in their respective lines of utility, he cannot afford it even for these. With a growing animal the problem is somewhat different than with a mature animal because while it grows it gives better returns for the feed than when mature. In case of beef cattle there must be, even with growing animals, some special compensation for the higher value of grain on eastern farms. In this experiment cheap hay and a low labor charge more than offset the high price of grain. Even though the amount of grain used was only sufficient to balance the hay ration for normal growth, it was the largest single item of expense, grain being 62 per cent of the feed cost and hay only 38 per cent. Had we used clover hay in sufficient quantity to obtain the same amount of growth the cost would have been about the same which shows that the grain was a good investment. Had we used grain of low protein content the cost would have been higher as with a similar amount of low protein grain we could not have balanced the ration for normal growth. In other words, a poor choice of grain would have

diminished the profit because it would not have produced the same amount of growth.

Gains on Pasture.

Gains on pasture are almost clear profit because practically all of our pastures are on land that cannot be cultivated. Hence if not used for grazing they are idle land which often reverts to useless brush.

The net profit per head for the grazing period of $5\frac{1}{2}$ months was about $27 per head. This net profit was estimated on a margin of one cent over the spring value which is very conservative as they were in a good state of flesh fit for local slaughter. This profit was made on a gain in live weight that, while very satisfactory, was not unusually high. With yearling steers of a similar type but of a more docile temperament, such as we could breed ourselves, the gains on pasture would probably have been somewhat higher.

The grazing sections of this country where cattle can be fleshed up well on grass are not very common. Some of the blue-grass areas of Virginia, Tennessee, and Kentucky are especially noted for this. There are at least parts of New Hampshire where cattle have been brought to a high state of flesh on grass only. Experience in this shows that, while we cannot compete with corn fed stock, we can put beef animals into a very desirable market condition on grass so that the old spectre grain need not prevent us from putting into a salable condition any beef cattle we can grow at a profit.

Economy of Labor an Essential.

The steers were kept loose in a barn or stable which had formerly been used for dairy cows. The stanchions had been removed and as the partitions did not extend back of the manger, the stable arrangement was not unlike that of any shed where beef cattle are generally kept, though perhaps somewhat more enclosed. The animals were kept loose, having access to a yard on the protected side of the barn, the door of which was kept open all day which afforded opportunity for the necessary exercise in the open.

The general arrangements for feeding and water were such as to reduce chore work to a minimum. The manger, being on the

barn floor level, was used for hay only. The two lower boards of the wall in front of the manger were hinged so that the hay could be shoved into the manger from the barn floor. In order to save time in feeding and at the same time to keep an abundant supply before them, the hay was weighed out twice a week and piled up on the barn floor and up against the opening to the manger. It was simply necessary, therefore, to shove the hay up against this opening once or twice a day so as to keep it continuously within reach of the animals. This occupied only a few minutes daily as the operation resembled somewhat the principle of the self-feeder.

The meal mixture was fed in troughs attached to the wall opposite the manger. This was mixed about once a month and the amount given daily was supplied in a pail which was marked inside to the desired capacity. Running water also was available. Bedding was supplied by the left-over stemmy portion of the hay, and manure was allowed to pile up for the whole season.

The amount of time spent in chore work, with a little system in its performance, amounted to about fifteen minutes per day to which should be added one hour a week for weighing hay.

This arrangement for winter management of beef cattle of this age and description is the common practice on beef cattle farms of the West. Except for such labor economy even western farmers could not handle such a large number of beef cattle as they do with the labor available. The same rule applies here. Economy of labor is the greatest single inducement to bring beef cattle back to some of our farms.

Cattle Prices and Market Fluctuations.

A possible drop in the cattle market is the factor of greatest uncertainty that troubles the farmer. If he knew in advance what the price would be in the future everything would be very clear sailing. In this connection it is well worth while to keep in mind the effect of supply and demand. Although the price of steak may remain the same the year around the market for growing stock will show distinct fluctuations especially in sections of the country adapted primarily for grazing. Here the fall will show a surplus and in spring there is a shortage. Hence the same kind of beef animal is worth a cent or two more a pound in

spring than in the fall preceding. The mere fact that an animal is approaching maturity adds some value to the price per pound. For example, the Chicago market during the middle of May last year quoted 400 to 600 pound stockers at $10.50 to $12 per hundred weight, whereas the 850 to 1,000 stockers sold at $12 to $13 per hundred weight. The increase in growth that animals make, is, therefore, not the sole compensation for the food and labor necessary to carry beef stock through the winter. They advance into a more valuable class as they grow older. In the case of this experiment had the animals been worth the same per pound in the spring as the fall preceding, which would really mean a drop of about two cents, the total net profit for the lot would have been only $9 instead of 89. In other words, with good beef cattle and good management we could stand a drop of two cents in the spring price and still pay market prices for hay and grain on an economic use of labor.

There is no probability that beef cattle prices will ever be very low again on stock that is fit for slaughter. There is now a relative shortage of meat and consumption is increasing whereas production is standing still. Our own country before the war had ceased to maintain a surplus of production, a condition which, with a growing population still further increasing consumption, will gradually force the price of beef up rather than down though there may be minor reactions.

Inducements for Growing Beef Cattle in New Hampshire.

The primary objective of the experiment was, as already stated, to determine the market value of a grade of hay for which there was no market, in the form of beef; *i.e.*, when fed to growing beef cattle.

At the outset of the experiment it was assumed that beef growing on pasture would pay a good profit with a good type of growing stock. Beef growing on pasture is a fairly safe proposition as it involves practically no labor and pasture charges are about the same in different localities and from year to year. Furthermore, cattle of good quality and of a similar age can be relied upon for fairly definite gains under pasture conditions.

Our main problem is our long winter or indoor feeding season which involves more labor and the use of feed which is subject

to very material fluctuations in price on the New England farms. This is especially true of hay the local market value of which is often far in excess of its feeding value. Therefore, if we can carry growing beef stock through the winter and break even after paying a fair price for feed, allowing that the manure should pay for the labor, the probable profit on pasture will be the measure of financial success. Failure to break even during winter reduces the year's profit in proportion. Hence surplus pasture and more barnyard manure are also important considerations that may make the growing of some beef stock advisable especially as the maintenance of soil fertility is a much greater problem than can be satisfactorily met by the use of commercial fertilizers. If the available labor on a farm is not sufficient to utilize the whole farm as a dairy proposition beef cattle may suit the conditions much better as one man can handle more animals and thus make use of more land. Whether beef animals should displace all or only a part of the dairy herd depends upon the particular circumstances or conditions of the case, especially on the basis that they are more of a one-man proposition.

Opportunities for Growing Beef Cattle.

At first sight it may appear that the chances for losing money on wintering cattle are exceptionally good. This would undoubtedly come true on many of the smaller farms. On others it would be quite the contrary, depending on the conditions. In proportion as we can control the four main factors mentioned the prospect whether profit or loss will be the result ceases to be a matter of chance or gamble and becomes a certainty. The motive that may induce one farmer to raise a few beef cattle may be quite different from that which actuates another. One man may live very far from a market so that he can show but little profit for his trouble when he has to deliver the produce such as milk, daily; another may be short of labor; a third may have some idle pasture and so the conditions vary. Basically the problem consists in marketing home grown farm crops by this indirect method. The farm which cannot grow the larger part of the feed necessary, including pasture, cannot afford to grow beef because we cannot compete with the West in this as a general proposition.

Beef cattle can in no sense compete with dairying where the latter is successfully operated, especially on small farms. Where dairying is not feasible because of labor difficulties, inaccessibility of markets for milk, or for other reasons, beef cattle may be a means of marketing farm products and at the same time contribute towards retaining soil fertility. The small farmer whose main asset is a pair of strong hands and an instinct of thrift and whose main handicap is in lack of acreage and working capital wants quick returns. Beef cattle breeding on a small scale is a slow way of turning out profits and that fact in itself makes the venture somewhat less certain of profits.

Many farms in New Hampshire are owned and operated by men who live in the city and who cannot pay daily visits to supervise the work. Unless they have experienced, skillful managers, dairying is entirely out of the question. Under such conditions beef cattle present many advantages. It is much easier for the owner to attend to the general guidance of the business at a distance and by infrequent visits. In other words, general supervision is not so exacting and consumes less time as the daily round of duties demand less skill and labor. The fact that they also demand less expensive equipment may be an additional inducement in favoring beef.

Large farms that have a considerable acreage in pasture and hay land, especially if located at some distance from railroads, would probably meet these conditions best. In fact, many such farms would probably be well suited to breeding or raising beef cattle. It is not probable that small farms in New Hampshire can breed beef cattle at a sufficient profit, though with cheap hay on hand and some surplus pasture they could pick up a few cattle now and then and grow them to a marketable age for the benefit of their purse as well as their soil.